# Case Study

## Aspire Systems-Experience in the Education vertical

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1. Online business education simulation with rich Web 2.0 traits

The Customer:
A US based corporation providing cutting-edge online learning experiences that challenge students with complex and ethically-charged nature of managerial decision making in a global economy by fusing incisive analytical learning challenges with broader issues surrounding the purpose and values of business enterprise.

Their Need:
The customer wanted to build a Web 2.0 laden application containing a portal for the sale, distribution, management, and execution of business simulation modules. This user-centric and collaborative portal had to also serve the purchased simulations, reports and resources related to profiles/roles of the subscribers. An Offline Simulation Builder with the ability to upload simulations to the site was needed to allow user-created content. Once the main components were setup, maintenance and continual enhancements to the software had to be carried out.

Our Deed:
Aspire Systems adopted an iterative approach to build the application. A LAMP stack architecture was used for the Simulation Engine and it was RIA enabled using Flex. To accelerate the development, Aspire used an MVC architecture framework using Zend to support multiple applications. Web 2.0 designs and concepts were incorporated to enable features like -

- Operating System and Browser independence
- Storing and streaming of live video for realistic business interactions
- Collection and reporting data inputs from users (instructors/students) for analysis/feedback and data mining for academic research
- An End user portal for marketing and selling the simulations (Shopping Cart) and integrating it with PAYPAL payment gateway
- Service based extensible approach to enable RESTful / SOA services
- Rich interface development for simulation players using Flash, Javascript, Flex and Zend
- User participation through Discussion boards, RSS feeds, integration with social networking sites, User-authored Content and Interactive Reporting

Tools and Technologies
LAMP, ZEND MVC framework, PDO, PEARDB, PEAR, Spreadsheet writer, Open Flash Charts
2. Re-engineering a business simulation software using C and LAMP

 Aç The Customer:
 Aç A key player in the experiential learning space; their business simulation software suite is used by leading academic specialists from top business schools and cover the areas of marketing, strategy, management, and international business.

 Aç Their Need:
 Aç To enhance and re-engineer their existing desktop based simulation software (written in VB) to meet the changing demands of worldwide customers. They also wanted their various simulation solutions available through a web interface with internationalization (I18N) support for multiple languages and accessible to global users.

 Aç Our Deed:
 Aç Aspire helped the customer re-engineer their simulation software engine from scratch using C and provided a flexible new web platform using the open source architecture of LAMP.

 Development highlights:

 Web enablement and internationalization – Using a custom-built MVC framework, the web interfaces were created using jQuery (for performing Ajax and DOM requests) and the PHP Smarty template for internationalization. PHP PDO, one of the fastest open source database abstraction libraries available for PHP, was used for database abstraction.

 Integration with the support system - Aspire built a closed web service using JSON RPC (Remote procedure call) to integrate their game admin support system and all their simulation tools, making administration easier and secure.

 Interfacing and Reporting – Data from participants is captured through web forms (PHP) and transferred to the database. The abstraction layer (built in C) interacts with the database, performs calculations based on the type of simulation game involved and sends the results back to the database. The results are then displayed both as web graphical reports wherever appropriate using commercial web based Flash charting component.

 Targeted simulation models - Aspire also developed entirely new simulation models for specific industries that were targeted by the customer.

 Aç Tools and Technologies
 Aç PHP 5.1.2, GCC, Custom-built PHP MVC framework, EclipsePDT, MySQL 5.0, Apache, SVN repository, RHEL, JQUERY, JSON, Smarty Multilanguage template engine, PHP-PDO, PHP-JSON, Ajax, GCC-MYSQL, Flash Charting Component.
3. Modernization of an education search product

► The Customer:
The leader in the delivery of digital K-12 educational content with a mission to help every child learn, through highly effective technologies. Their product is the No.1 educational search tool in K-12 schools, is used in thousands of schools in the US, and serves millions of students worldwide.

► Their Need:
The customer wanted to re-engineer their standards-based educational tool with newer, robust and extensible technologies and architecture to accommodate growing business needs such as real time publishing, internationalization, branded product interfaces for different geographies, content & account management integration with other products and contents and student productivity tools.

► Our Deed:
Aspire designed and developed an extensible content workflow framework as part of modernizing the search product. A new search algorithm was developed for optimum results and indexing and content publishing were reduced from a 3 month timeframe to real-time updates. Aspire also designed and implemented a REST-based, custom-built framework and architecture for the product.

Development highlights:

- New search algorithm was developed using the open source Lucene library and Solr, an open source search server, to obtain meaningful results for any search.
- Real-time indexing and content publishing was made possible by making use of the Lucene indexing process and a custom-developed scheduler framework using Quartz libraries.
- To support multiple tenants, various abstract patterns were developed in the data layer. Business logic was delegated to the service layer and completely independent of the UI, so that customization of interfaces was possible for different geographies.
- Appropriate authentication techniques for B2B communications to import content and integrate with external applications and products were developed.

► Tools and Technologies used:
Java, Restlets, custom-built framework for major architectural components, Eclipse, MySQL, Apache, Tomcat, SVN repository, Version One, Trac, Maven, Hudson, JQUERY, JSON, Ajax, Findbug, PMD
4. E-learning Assessment Engine

The Customer:
An eLearning solutions provider delivering Course Management software, Custom Course Development, Course Libraries, Assessment and Testing toolkits to more than 850,000 users.

Their Need:
An Assessment Engine that integrates with the courses that would provide the users an option to perform assessment or self-assessment.

Our Deed:
Aspire Systems developed the web-based Assessment Engine that includes assessment authoring, assessment tracking, grading, reports and alerts. This engine supports multiple question types and navigation based on defined parameters, an essential requirement of the product. It provides personalization options for assessments like timed assessments, multiple sections, and randomization of questions with various levels of difficulty.

It also has profile synchronization and single sign-on integrated, centralized and customized authentication and management, and integration with the customer’s rights management and license management modules.

Development highlights:

Performance Tuning – Aspire migrated from Objectivity database to MySQL, which reduced the response time from 60 Seconds to a few milliseconds. Hibernate was used along with MySQL for Object-Relational Mapping to mitigate issues of database portability.

Clustering for high availability - To ensure high availability of the customer’s web-based service even during system outages and maintenance periods, Aspire clustered several web-servers together. The database was also clustered with two servers using master-master replication.

SOA for Scalability – Service Oriented architecture was implemented in order to scale horizontally rather than vertically.

Permission based Security - The whole system functions based on permissions that ensure each user accesses only the data that is permitted for their use.

Tools and Technologies used:
JDK1.4, Jetty Web Server, Jini Based Distributed Architecture (SOA), Objectivity (OODBMS), MySQL, Eclipse 3.1, HTML, DHTML, Javascript, XML, MVC based service oriented framework.
5. Open-source, on-demand Program Management System for nutrition education community

**The Customer:**
A startup company that provides web-based program management to the nutrition education community in the U.S.

**Their Need:**
A highly reliable and scalable, web-based specialty Program Management System (PMS) that would target Supplemental Nutrition Assistance Program - Education (SNAP-Ed), EFNEP and WIC.

The customer wanted an intuitive, user-friendly system that would provide benefit equally through all levels of the software. Above all, the software had to fully respond to Education and Administrative Reporting System (EARS), the reporting standard for SNAP-Ed, and have an implementation date of FY10 (October 1, 2009 – September 30, 2010).

**Our Deed:**
Aspire built a flexible Software-as-a-Service (SaaS) Program Management System (PMS) from concept to implementation using open-source LAMP stack and integrated it with a custom-built MVC framework, which is customizable for future expansion programs of nutrition education.

Providing a comprehensive program management system, the following report elements were integrated into the PMS –

- Program/project goals and objectives, start and end dates, curriculum and course materials, program locations and contact information, participant demographics and details, and various other administrative tasks.

In addition to program details, participant demographics and time saving, the PMS reporting includes features for personnel appraisal which facilitates coaching of educators by their supervisors – a benefit well beyond the basic federal reporting requirements.

Meeting the client’s objectives, the application simplifies program management and operation; improves collaboration among nutrition educators; and provides a comprehensive reporting system that meets all Education and Administrative Reporting System (EARS) requirements.

**Tools and Technologies used:**
PHP 5.1.2, Customized PHP MVC framework, EclipsePDT, MySQL 5.0, Apache, SVN repository, RHEL, Ext-JS, JSON, Smarty template engine, PHP-GD, AJAX
6. Migrating an eLearning portal to .Net

► The Customer:
US’s leading higher education consortium formed by American Public University, American Military University, and American Community College for offering various courses to 50,000 distance learners studying in 50 states and more than 100 countries.

► Their Need:
They had a product which provided online services to the students of the universities American Public University, American Military University, and American Community College. The application had to be migrated from classic ASP to .NET.

► Our Deed:
Aspire developed a .Net-based system for the customer, with its product architecture logical view having three layers: presentation layer, business logic layer, and database layer. The presentation layer is the interactive web interface (web forms) that allows users to view, input, and modify information, the business layer contains business logics that the staff can modify and the database layer stored information provided by users.

Using Microsoft Message Queue Server (MSMQ), we succeeded in achieving seamless integration of the management system with the University’s third-party payment gateway, Great Plains. It deployed RS Algorithm and encryption algorithm module, and made all payment-related transactions and exchange of financial data take place using HTTPS protocol.

Some of the salient Java features and enterprise-class designs in this product include:

- **Load balancing server**: This application will support the web farm methodology (load balancing server) in order to withstand huge hits to the site.
- **Encryption**: In order to make the application as highly secured, RSA Encryption was used to store the password.

► Tools and Technologies used:
ASP.Net, VB .Net, SQL Server 2000, MSMQ for integration
7. Migrating a Professional Development Management system to a SaaS application

💰 The Customer:
A leader in data-driven decision-making solutions that enable school districts in the US to integrate, access and analyze student demographic and performance data.

💰 Their Need:
The customer’s stand-alone application, Professional Development Manager, installed in districts across the US had different versions of the software. They wanted to optimize the solution by creating a single instance of their solution that can be configurable to different districts. They also wanted to integrate this solution with their core Suite of products.

💰 Our Deed:
The Customer had 2 independent Product suites – 1) Instructional Management System (IMS), which is an on-demand solution and their core product suite and 2) Professional Development Manager (PDM), which is a stand-alone application. Aspire helped the customer in unifying multiple installations of PDM by re-architect their existing On-Premise solution to a SaaS based solution by building key characteristics like highly configurability, scalability and multi-tenant efficient solution.

Development highlights:

Configuration – The administrator was provided the ability to configure and modify the PDM sites for individual districts as needed and add new fields to the application based on individual district needs using a configurable UI designed to manage these settings.

Custom workflow – Aspire provided DB level configurations so that each district can select their own workflow settings for tasks like review/approval of functionalities like Professional Development plan, Proposal making, credit request, etc.

Integration – The PDM’s management was diverted to the IMS’ user management system. Authorization and security policies were taken care for each of the district to ensure data is kept separate from that of other districts; and from the end user’s perspective, there was no indication that the application instance was shared among multiple tenants.

💰 Tools and Technologies used:
IIS 5.1 or above, Microsoft .NET 2.0, SQL server 2005, C#, ASP.NET, Visual Studio 2005 & Team Foundation Server (TFS), Javascript
ABOUT ASPIRE SYSTEMS
Aspire Systems provides end-to-end software development services to Independent Software Vendors (ISVs)/packaged software providers, Software-Enabled Businesses and Innovative Enterprises.

We are passionate about Producteering™ – our approach to creating software better and faster. It helps us deliver tangible business results for our customers through technology. Our key strengths are in the areas of SaaS, Cloud Computing, Web 2.0/RIA, Mobile, Test Automation, Agile/Scrum, and in the Healthcare domain.

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